What We Do

The central focus of the D. E. Shaw group is the pursuit of potentially attractive investment opportunities, and in some cases, the active creation of new ones. Such opportunities form the basis for a number of funds and other investment vehicles, and for the firm's management of assets on behalf of institutional clients. The firm's investment activities may be divided into two broad categories—quantitative strategies based on mathematical and computational models and qualitative strategies based on the analysis of human experts. In addition, the firm conducts basic research aimed at achieving scientifically and economically significant advances over a relatively long time horizon.

The firm deployed its first quantitative strategy soon after its founding in 1988, and is now widely recognized as one of the pioneers of the field of computational finance. Quantitative techniques remain a central focus of the firm's activities, and are used to identify underpriced and overpriced securities, to manage various forms of portfolio risk, and to reduce the cost of transacting in various financial instruments. While a great deal of human effort is expended conducting scientific research in each of these areas, the firm's quantitative strategies are largely based on mathematical models embodied in computer software rather than on human judgments regarding the fundamental soundness of the underlying companies or other assets.

By way of contrast, the firm's qualitative strategies are based on the detailed analysis of particular companies, resources, industries, economies, and entrepreneurial opportunities by experts with extensive asset– and market–specific knowledge. Investments include both publicly traded and privately held financial instruments, certain physical commodities and commercial rights, and in some cases, entire companies. The firm also provides individually tailored debt and equity financing to both healthy and financially distressed companies, makes venture capital investments in early– and later–stage ventures, and organizes and develops new technology-oriented ventures of its own.

D. E. Shaw Research, LLC engages in long-term, high-risk research that could ultimately lead to transformative scientific and technological innovations and to potentially substantial financial returns. The unit's current efforts are primarily focused on the development of new algorithms and specialized supercomputer architectures for ultra-fast biomolecular simulations, and on the application of such technologies to important scientific and pharmaceutical problems.

Quantitative Strategies

The firm's quantitative strategies are for the most part based on

- the use of mathematical techniques to identify profit opportunities arising from subtle anomalies affecting the prices of various securities;
- the application of proprietary models designed to measure and control various forms of risk;
- the use of quantitative techniques to minimize the transaction costs associated with the purchase and sale of securities; and
- the utilization of proprietary optimization technology to construct dynamically evolving investment portfolios based on these profit opportunities, risk factors, and transaction costs.

Our quantitative models and strategies are based on extensive internally funded scientific research conducted since 1988 at a cost of hundreds of millions of dollars. These technologies are currently deployed in a number of investment funds managed by the D. E. Shaw group, and are also used in the construction of long-only and net-long portfolios on behalf of our institutional asset management clients.

In the course of identifying profit opportunities, the D. E. Shaw group analyzes an enormous amount of data associated with tens of thousands of financial instruments, along with various factors not associated with any one such instrument. Data is obtained from many countries throughout the world, and covers a wide range of asset classes. When this analytical process yields a new model the firm believes to be of predictive value, it becomes eligible for deployment within one or more trading strategies, in some cases along with a dozen or more other models involving some of the same financial instruments, but arising from different market anomalies.

The firm's proprietary optimization technology was designed with the objective of maximizing expected return while controlling the aggregate risk associated with a portfolio that may in some cases include simultaneous positions in several thousand securities. Rather than consider each transaction in isolation, the firm's portfolio optimization software is designed to account for complex interrelationships among a large set of financial instruments that may range over a number of different asset classes. In many cases, the firm's optimization algorithms are able to enhance risk-adjusted returns not only through conventional diversification, but by establishing offsetting exposures to various risk factors at the portfolio level.

Portfolios are often reoptimized on a more-or-less continuous basis, with a steady stream of trades executed to take advantage of newly emerging potential profit opportunities and/or to manage various forms of dynamically varying risk. Time-sensitive trading decisions are often made very rapidly using real-time data obtained from various sources throughout the world's financial markets. The firm trades on nearly a 24-hour basis, and typically executes tens of thousands of transactions per day.

Qualitative Strategies

Although it initially engaged exclusively in quantitative trading, the D. E. Shaw group now devotes a large share of its attention and capital to investment activities based on the identification of profit opportunities by human experts. Such *qualitative strategies* have accounted for much of the firm's growth over the years, and now represent an equally important element of its strategic focus. Included in this category are such diverse activities as

- the analysis of publicly traded financial instruments based on an assessment of the fundamental value of the underlying companies or assets;
- private equity transactions involving the acquisition of ownership interests in both new ventures and established enterprises;
- the design of customized solutions to the financing needs of both profitable and financially distressed companies; and
- the acquisition or development of physical assets within areas in which the firm has special expertise.

Although the firm's quantitative expertise is often exploited in the course of portfolio optimization, risk management, and the valuation of complex financial instruments and capital structures, these strategies are primarily driven by qualitative assessments of the actual or potential value of various assets or companies. Human judgment also plays an essential role in the management of various non-quantifiable forms of risk.

The D. E. Shaw group engages in various forms of private equity investing, acquiring either minority or controlling interests in both early-stage and established companies. Under certain circumstances, the firm may acquire outright ownership of selected privately held enterprises, either directly or through the acquisition of a company's key business assets. Our venture capital unit pursues unusually promising opportunities for investments in companies at various stages of development, from new ventures in need of seed capital through later-stage firms seeking additional funding for expansion. On occasion, the firm has itself developed new entrepreneurial ventures, several of which have ultimately been spun off as separate entities or merged with other companies.

One of the firm's business units uses flexible financial engineering techniques to rapidly design customized solutions to the financing needs of both publicly traded and privately held companies. Depending on the circumstances, the firm may offer financing in the form of senior, mezzanine, or convertible debt, preferred or common equity, or any of a variety of more specialized funding structures. Another group plays an active role in preserving and enhancing the value embodied in companies that may currently be experiencing financial distress, but which the firm nonetheless believes to be fundamentally viable. Related activities range from the acquisition of impaired bank debt, bonds, or other financial instruments to the direct financing or restructuring of troubled companies.

In another group, analysts with extensive industry-specific experience assume long and short equity positions in publicly traded companies within those industries, in some cases utilizing novel research methods not employed by most investors. Other analysts focus on factors influencing the price of financial instruments ranging from sovereign bonds to commodity futures. The firm has special expertise within the energy sector, and engages in activities ranging from the trading of various energy-related commodities and financial instruments to the purchase of ownership positions in power plants and other physical assets. In the course of pursuing financial opportunities on behalf of its

D. E. Shaw Research

D. E. Shaw Research, LLC ("DESRES") conducts fundamental research in areas that could be qualitatively transformed by new scientific and technological advances. This internally funded unit tends to focus on long-term, high-risk research whose potential payoff could ultimately be quite large in terms of scientific discoveries, financial returns, and societal benefits.

At the present time, DESRES is pursuing an active research program in the field of computational biochemistry under the direct scientific leadership of David Shaw, founder of the D. E. Shaw group. Although Dr. Shaw continues to serve as chairman of D. E. Shaw & Co., Inc., he now devotes the majority of his time to hands-on scientific research in his role as chief scientist of DESRES.

Dr. Shaw's research group is currently focusing primarily on molecular simulations involving proteins and other biological macromolecules of potential interest from both a scientific and a pharmaceutical perspective. The group includes computational chemists and biologists, computer scientists and applied mathematicians, and computer architects and engineers, all working collaboratively within a tightly coupled interdisciplinary research environment. Current activities range from the design of specialized, massively parallel supercomputers and numerical algorithms for ultra-high-speed molecular dynamics simulations to the use of such simulations to elucidate the molecular mechanisms of cancer and other diseases.